

What is claimed is:

1. A mixer, comprising:

a first transistor for amplifying a radio frequency  
5 (RF) signal;

a second and a third transistor, each connected to the  
first transistor, for receiving a balanced local oscillator  
(LO) signal to mix it with the RF signal;

a first and a second load element connected between a  
10 supply voltage source and the second transistor and between  
the supply voltage source and the third transistor,  
respectively; and

a fourth transistor, connected between the supply  
voltage source and the first transistor, for amplifying the  
15 RF signal and bleeding a current from the supply voltage  
source.

2. The mixer of claim 1, wherein drains of the second and  
third transistor are connected to the first and the second  
20 load element, respectively, and each source of the second  
and third transistor is connected in parallel to a drain of  
the first transistor and a gate and a drain of the fourth  
transistor are connected to a gate and a drain of the first  
transistor, respectively.

3. The mixer of claim 2, wherein each of the first,

second and third transistor is an N-channel MOSFET and the fourth transistor is a P-channel MOSFET.

4. The mixer of claim 3, further comprising a coupling capacitor between the gates of the first and the fourth transistor.

5. The mixer of claim 4, wherein the first and the second load element are resistors.

6. A mixer, comprising:

a first differential circuit including a first and a second transistor connected differentially to each other, for amplifying a balanced radio frequency (RF) signal;

a second differential circuit including a third transistor and a fourth transistor connected differentially to each other, the third and the fourth transistor being connected to the first and the second transistor, respectively, for receiving a balanced local oscillator (LO) signal to mix it with the balanced RF signal;

a third differential circuit including a fifth and a sixth transistor connected differentially to each other, the fifth and the sixth transistor being connected to the first and the second transistor and cross-coupled to the third and the fourth transistor, respectively, for receiving a balanced local oscillator (LO) signal to mix it with the

balanced RF signal;

a first and a second load element connected between a supply voltage source and the third transistor and between the supply voltage source and the sixth transistor, respectively; and

a fourth circuit including a seventh and an eighth transistor, connected to the supply voltage source and the first differential circuit, for amplifying the RF signal and bleeding a current from the supply voltage source.

7. The mixer of claim 6, wherein each of the first through the sixth transistor is an N-channel MOSFET and each of the seventh and the eighth transistor is a P-channel MOSFET.

8. The mixer of claim 7, further comprising coupling capacitors between the gates of the first and the seventh transistor and the second and the eighth transistor, respectively.

9. The mixer of claim 8, wherein the first and the second load element are resistors.